

WHAT IS CLAIMED IS:

1. An optical data storage medium comprising:
  - a storage layer having one or more data storage tracks thereon which define a data track pitch, and
  - 5 a micro-lens array positioned proximate to said one or more data storage tracks, wherein said micro-lens array comprises a periodic structure defining at least first and second repeating periods, and wherein said periodic structure induces a virtual track pitch having a pitch which is different than said data track pitch.
- 10 2. The optical data storage medium of Claim 1, wherein said micro-lens array comprises first and second interleaved lenses.
3. The optical data storage medium of Claim 2, wherein said interleaved lenses are spiral lenses.
- 15 4. The optical data storage medium of Claim 2, wherein said first lens is taller than said second lens.
5. The optical data storage medium of Claim 2, wherein said first lens is wider than said second lens.
- 20 6. The optical storage medium of Claim 2, wherein said first lens is disposed a first distance from said second lens in a first direction and said first lens is disposed a second distance from said second lens in a second direction.
7. The optical data storage medium of Claim 1, wherein said micro-lens array comprises a single lens.
- 25 8. The optical data storage medium of Claim 7, wherein said lens is a spiral lens.
9. The optical storage medium of Claim 7, wherein a portion of said spiral lens located between first and second adjacent portions is disposed a first distance from an adjacent portion in a first direction and is disposed a second distance from an adjacent portion in a second direction.
- 30 10. The optical data storage medium of Claim 7, wherein a first portion of said single spiral lens is taller than a second portion of said single spiral lens.

11. The optical data storage medium of Claim 7, wherein a first portion of said single spiral lens is wider than a second portion of said single spiral lens.

12. The optical data storage medium of Claim 1, wherein said micro-lens array comprises a series of concentric circular lenses.

5 13. The optical data storage medium of Claim 12, wherein a first portion of said lenses have a first height and a second portion of said lenses have a second height.

14. The optical data storage medium of Claim 12, wherein a first portion of said lenses have a first width and a second portion of said lenses have a second width.

10 15. An optical storage device comprising:  
a far field optical pick-up unit and an optical data storage medium, said optical data storage medium comprising:

15 a storage layer; and  
a plurality of adjacent track portions for storing optical artifacts on said storage layer, wherein said track portions define a radial track pitch of  $N/2$  microns, and wherein said optical artifacts are readable by an optical drive configured for tracking an N micron track pitch.

16. The optical storage medium of Claim 15, wherein N is approximately .74 micrometers.

20 17. The optical storage medium of Claim 15, wherein said plurality of adjacent track portions are formed from two interleaved spiral tracks.

18. The optical storage medium of Claim 15, wherein said plurality of adjacent track portions are formed from a plurality of unconnected concentric circular tracks.

25 19. The optical storage medium of Claim 15, wherein said plurality of adjacent track portions are formed from a single spiral track.

20. The optical storage medium of Claim 15, wherein at least some of said adjacent track portions are positioned beneath a micro-lens superstructure, and wherein different portions of said superstructure over different adjacent tracks have different physical characteristics.

21. An optical storage medium comprising:

a first track for recording optical artifacts having a track pitch of

N microns;

5 a second track for recording optical artifacts having a track pitch of N microns;

wherein said first track and said second track are interleaved such that there is an average track pitch of  $N/2$  microns between said first and second tracks.

10 22. The optical storage medium of Claim 21, wherein said first track is disposed a first distance from said second track in a first direction and said first track is disposed a second distance from said second track in a second direction;

23. The optical storage medium of Claim 21, wherein said first and second tracks are positioned beneath a first and second micro-lens, respectively.

15 24. The optical storage medium of Claim 21, wherein said first micro-lens has a first height and said second track has a second height.

25. The optical storage medium of Claim 21, wherein said first micro-lens has a first shape and said second micro-lens has a second shape.

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